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JACKSON WALKER LLP
2435 NORTH CENTRAL EXPRESSWAY
SUITE 600
RICHARDSON, TX 75080

EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/092,956	KEMP ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-99* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-99* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on August 22, 2003 has been received and carefully considered. The changes made to the specification are acceptable. Claims 1-99 remain active.

Response to Arguments

2. Applicant's arguments filed on August 22, 2003 have been fully considered but they are not persuasive.

A. Rejection of claims 1-5, 13, 14, 18-39, 49, 50, 51-66, 74-75, 80, 83, 94 and 97-99 under 35 U.S.C. 103(a) as being unpatentable over Bradford (U.S. 3,881,700).

On page 23 (section A, second paragraph) of the response, Applicants argue,

> "Bradford is directed to a water treatment plant in which soiled water is mixed with treatment chemicals. The processes involved in water treatment do not result in excess heat release and thus this technology is not comparable to Applicant's apparatus. The cup-shaped member of Bradford is not equivalent to Applicant's distribution-blending-cooling dish because the cup shaped member is shaped like a cup, which promotes turbulent mixing rather than mixing in a thin layer."

The Examiner respectfully disagrees and maintains that the apparatus of Bradford meets the claims, since a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). For example, Bradford discloses, "The tank may be constructed of *any suitable material* such as stainless steel, plastic or sheet metal *that does not react with the chemical* when combined with the water," (column 2, lines 55-59), and thus would

be applicable to acidic and/or basic chemicals, depending on the suitable material chosen for the intended use. Also, the structural elements in which applicant relies for providing "excess heat release" are not recited in the rejected claims (i.e., a chamber cooling coil, a dish cooling coil, etc.). Regarding applicant's argument that the, "cup-shaped member of Bradford is not equivalent to Applicant's distribution-blending-cooling *dish* because the cup-shaped member is shaped like a *cup*, which promotes turbulent mixing rather than mixing in a thin layer," the limitation that, "the acid and the base are mixed within a thin layer on the distribution-blending-cooling dish" in claim 1 (lines 8-10) has not been given patentable weight, since the manner in which the acid and base are mixed is drawn to a process limitation, and not an element of the apparatus. The structural limitations upon which Applicants rely for distinguishing the distribution-blending-cooling dish from the cup of Bradford (i.e., specific dish depth, diameter, etc.) are not recited in the rejected claims.

On page 23 (section A, third paragraph), Applicants additionally argue,

> "... Bradford delivers its soiled water and treatment chemicals to the chamber in a single conduit pipe, rather than through separate acid and base delivery systems. As seen in Figure 1 of Bradford, the mixed water and chemicals enter the tank through a single conduit pipe (14), having already been mixed together at the T connection (18). Thus, the water delivery system and the chemical delivery system of Bradford are not structurally equivalent to the acid and base delivery system of Applicant's apparatus."

The Examiner respectfully disagrees and contends that Applicant's arguments are not commensurate with the language of the claims. As independently claimed, the apparatus comprises, "an acid delivery system *for introducing the acid into the chamber and to the distribution-blending-cooling dish*," and "a base delivery system *for introducing the base into the chamber via the distribution-blending-cooling dish*". Note that "separate" introduction via the acid and base delivery systems is not recited in claim 1. Thus, the apparatus of Bradford

meets the claims, since the delivery systems need only feed the chemicals *into* the dish (cup) and chamber, with no further indication of combined or separate introduction.

* * *

B. Rejection of claims 6-8, 15-17, 67-69 and 76-78 under 35 U.S.C. 103(a) as being unpatentable over Bradford in view of Van Loenen (U.S. 2,930,677).

On page 24 (section B, third paragraph) of the response, Applicants argue,

> "Van Loenen is directed to the use of thermoplastic coatings within an apparatus for mixing scale forming compounds. Scale formation is not a concern within Applicant's apparatus for mixing acid and base. In addition, Van Loenen is directed to the use of Bayer caustic aluminum liquors and not acids and bases."

However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In the instant case, the "thermoplastic coatings" of Van Loenen may comprise polytetrafluoro ethylene or Teflon ^{TM} (column 4, line 44-column 5, line 2), which is substantially the material recited in claims 6-8 and the specification, i.e., section [0006]. Therefore, the prior art structure is capable of performing the recited intended use of a non-corrosive coating for acid-base mixing.

* * *

C. Rejection of claims 1-5, 13, 14, 18-32, 34-40, 42, 49, 50, 53-58, 61-66, 74-75, 83, 84 and 99 under 35 U.S.C. 103(a) as being unpatentable over Chu (U.S. 5,782,556).

On page 25 (section C, second paragraph) of the response, Applicants argue,

> "Chu does not disclose, teach, or suggest a distribution-blending-cooling dish which

> allows gradual mixture of an acid and base in a thin layer. Chu discloses a conical filter, not a dish. The conical filter of Chu is not structurally equivalent to Applicant's distribution-blending-cooling dish because the conical filter forces the components to drain through the perforations rather than mix in a thin layer. In addition, Chu is directed to an apparatus for emulsifying fuel, not an apparatus for mixing acid and base. The only structural purpose of Chu's apparatus is thoroughly mixing the components, not mixing them gradually in a thin layer on a dish in order to minimize the formation of lumps and excess heat release."

The Examiner respectfully disagrees and maintains that the conical filter of Chu structurally meets the claims, since the limitation that, "the acid and the base are mixed within a thin layer on the distribution-blending-cooling dish," in claim 1 (lines 8-10) has not been given patentable weight, as the manner in which the acid and base are mixed is drawn to a process limitation, and not an element of the apparatus. The structural features upon which applicants rely for distinguishing the distribution-blending-cooling dish from the conical filter of Chu (i.e., dish depth, diameter, etc.) are not recited in the claims. Furthermore, it is unclear as to how the conical filter differs from applicant's distribution-blending-cooling dish, when taken in view of the specification (i.e., page 12, section [0023]). Although limitations from the specification are not read into the claims, *for the sake of argument*, applicants disclose, "one or more holes in the middle or arranged in a circular pattern around the center hole to allow fluid to fall from the dish at different locations of the distribution-blending-cooling dish 120." Thus, it is unclear as to how the conical filter of Chu, comprising "a *perforated film plate* converging downwardly," (column 2, lines 55-62), structurally differs from applicant's distribution-blending-cooling dish, which also comprises perforations defined by said "one or more holes" and "a center hole". Lastly, in response to the assertion that the apparatus of Chu, used for emulsifying fuel, does not meet the apparatus as instantly claimed, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to

patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

* * *

D. Rejection of claims 41, 43-48 and 85-92 under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Platz, deceased, et al. (U.S. 4,164,541).

On page 25 (section D, third paragraph) of the response, Applicants argue,

> "Platz discloses venturi pumps used for making fertilizer, which are not structurally equivalent to the eductors of Applicants' apparatus. Each of Platz's venturi pumps is composed of a reaction chamber (46), a nozzle (42), and a tube (40). The acid and base are reacted within the reaction chamber of the venturi pump, not within the mixing tanks. The heat and energy released as a results of the mixing of the acid and base result in the expulsion of the product from the reaction chamber through the tube. Thus, Platz's venturi pumps are not eductors for generating a vortex."

The Examiner maintains that the venturi pumps of Platz meet applicant's eductors, as instantly claimed. Claim 43 recites a vortex generator comprising a plurality of *circulation* eductors inside the chamber and a pump in fluid communication with the plurality of *circulation* eductors; whereby the pump circulates the acid through the plurality of eductors *to initiate a movement of the acid in a rotational direction to create a vortex*. Similarly, the mixing means of Platz, comprising a plurality of venturi pumps (i.e., a venturi pump **21**) powered by electrical pumps (i.e., pump **18'**), performs the substantially identical function of *circulation* or *initiating movement* of the product in a rotational direction to create a vortex (i.e., see flow lines in Figures 1 and 2; column 3, lines 4-8; lines 30-32). Thus, it is unclear as to how the venturi pumps of Platz structurally and/or functionally differ from applicant's eductors.

* * *

E. Rejection of claims 1-5, 9-14, 62-66, 70-75 and 83 under 35 U.S.C. 103(a) as being unpatentable over Balla et al. (GB 2 236 694).

On page 26 (section E, second paragraph) of the response, applicants argue,

> "Balla does not disclose, teach, or suggest the distribution-blending-cooling dish of underlying claims 1 and 63. The Examiner asserts that the "inner vessel" of Balla is equivalent to Applicants' distribution-blending-cooling dish. However, Applicants respectfully assert that Balla's apparatus contains only one vessel. The reference in Balla to the "inner vessel of the reactor 11 itself" refers merely to the only vessel in the interior of the apparatus, which is bound by a heat-transfer surface 46 on the internal side of the boundary wall."

The Examiner respectfully disagrees and maintains that Balla discloses two separate vessels --- the primary vessel as defined by reactor **11** itself, and an inner vessel. Please refer to the disclosure which states, specifically, "In a suitable case *the inner vessel of the reactor 11 itself may be exchangeable* in order to match the actually required volume," (page 6, lines 5-7; with emphasis added).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2-5, 22, 23, 28-30, 46, 48, 63-66, 89 and 92 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 2-5 and 63-66, the language of the claim is drawn to a method limitation which renders the claim vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since "the acid" and "the base" are not elements of the apparatus.

Regarding claims 22, 23, 28 and 29, the language of the claims is drawn to a method limitation which renders the claims vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since "the hard particles" are not elements of the apparatus.

Regarding claim 30, the language of the claims is drawn to a method limitation which renders the claims vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since "a slurry" is not an element of the apparatus.

Regarding claims 46 and 89, the language of the claims is drawn to a method limitation which renders the claims vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since "the rotational speed of the dilute acid" and "size of the vortex" are not elements of the apparatus.

Regarding claim 48 and 92, the language of the claims is drawn to a method limitation which renders the claims vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since "the vortex" is not an element of the apparatus.

Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-5, 13, 14, 18-39, 49, 50, 51-66, 74-75, 80, 83, 94 and 97-99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradford (U.S. 3,881,700).

Regarding claims 1, 62 and 83, Bradford (FIG. 1, 4; column 2, line 37 to 3, line 29) discloses an apparatus comprising:

a) a chamber (i.e. defined by cylindrical tank **16**);

b) a dish (i.e. cup-shaped member **38**) suspended therein;

c) a raw water delivery system (i.e. comprising pump **12** and conduits **10**, **14**, **46**) for introducing or spraying raw water into the chamber and to the dish **38** (see FIG. 4, which illustrates the spray of solution exiting via holes **48** in the form of directional arrows); and

d) a chemical delivery system (i.e. comprising pump and supply **22**, conduits **20**, **14**, **46**) for introducing or spraying a chemical into the chamber via dish **38** (see FIG. 4, which illustrates the spray exiting via holes **48** in the form of directional arrows).

Dish **38** comprises a "distribution-blending-cooling" dish, since the dish distributes the solution of water and chemical by deflecting the mixture upwards towards the top of the chamber, and further blends as well as inherently cools the mixture via the turbulent mixing caused by the collision of the solution with the dish (column 1, lines 44-55). In addition, the delivery systems (comprising electrical pump **12** and chemical pump/ supply **22**) are inherently capable of regulating a rate of flow and amount of water introduced or sprayed into the chamber since it is well known in the art that pumps comprise means for speed or feed rate adjustment. Although Bradford is silent as to whether specifically an "acid" or "base" may be introduced via the delivery systems, Bradford discloses, "Many different types of conventional chemicals can be utilized in the purification," and further lists examples of aluminum sulphate in combination

with liquid lime and calcium chloride (column 4, lines 21-26). Furthermore, Bradford discloses, "[t]he tank may be constructed of any suitable material such as stainless steel, plastic or sheet metal that does not react with the chemicals when combined with water." (column 2, lines 55-59). Therefore, the apparatus of Bradford structurally meets the claim and would be inherently capable utilizing acid and base, depending on the intended use.

Regarding claims 2-5 and 63-66, no further structural limitations are recited, since "the acid" and "the base" are not elements of the apparatus. Therefore the apparatus of Bradford meets the claims.

Regarding claims 13-14 and 74-75, Bradford discloses, "the cup-shaped member has a square bottom **40** with side walls **42** extending upwardly therefrom at an angle approximately 45 degrees," and "the angle of the side wall should extend upwardly and outwardly at an angle between 45 degrees and 60 degrees." (column 3, lines 5-12). Bradford also discloses, "the depth of the cup should be three times the diameter of the delivery pipe **46** so as to confine the water within the cup **38** to produce sufficient turbulence." (column 4, lines 18-21). Therefore, the dish **38** is inherently of, "an adequate size/a minimal depth and shape to allow broad distribution of the solution". In any event, changes in shape involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 18 and 24, Bradford discloses the delivery systems comprise a spray mechanism (FIG. 4, which illustrates the spray of solution exiting via holes **48** in the form of directional arrows).

Regarding claim 19-21 and 25-27, Bradford discloses that the solution flow reversal as

caused by the deflection of the solution towards the top of the chamber (i.e. via travel "in-air") aids in mixing and dissolving all of the chemicals left in the water and completes the formation of floc (column 1, lines 44-55).

Regarding claims 22-23 and 28-29, no further structural limitations are recited, since "the hard particles" are not an element of the apparatus but a product depending of the apparatus. Therefore the apparatus of Bradford meets the claims.

Regarding claim 30, no further structural limitations are recited, since slurry is not an element of the apparatus. Thus the apparatus of Bradford meets the claim. In any event, Bradford discloses the delivery of an inherently slurry like chemical (i.e. aluminum sulphate in combination with liquid lime and calcium chloride; column 4, lines 22-26).

Regarding claims 31 and 49, Bradford (FIG. 1, 4; column 2, lines 37-50; column 3, lines 18-21) discloses the delivery systems each comprise:

a) a pump (i.e. electrical pump **12** or chemical pump and supply **22**); and

b) a delivery nozzle (as defined by holes **48** of conduit **46**), wherein the pump and delivery nozzle are coupled thereto to introduce materials into the chamber.

Regarding claims 32 and 50, Bradford discloses the delivery systems each comprise a reservoir (i.e. any suitable source of raw water or the chemical pump and supply 22; column 2, lines 37-50) for the material being introduced into the chamber (i.e. which may comprise acid or base, depending on the intended use).

Regarding claims 33, 51, 52, 80 and 94, although Bradford is silent as to a cooling coil and temperature sensor coupled to the material reservoirs, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide such

cooling means for the apparatus of Bradford, on the basis of suitability for the intended use and absent showing any unexpected results, since the cooling of raw materials prior to introduction to a process and the use of cooling coils coupled to temperature sensors as the cooling means is well known in the art.

Regarding claims 34, 39, 53 and 58, the electrical pump **12** and the chemical pump and supply **22** of Bradford are inherently capable of regulating the rate of flow or the amount of the material into the chamber, since it is conventionally known in the art that pumps comprise means for speed or feed rate adjustment.

Regarding claim 35-38 and 54-57, although Bradford is silent as to the regulation of the flow rate via flow valves, flow meters, and flow controllers, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such control elements to the apparatus of Bradford, on the basis of suitability for the intended use and absent showing any unexpected results thereof, since flow valves, flow meters, and flow controllers are well known flow regulation means in the art.

Regarding claims 59 and 97, Bradford further discloses, "[t]he chemicals carried within the solution into the tank through the conduit **14** causes formation of floc," and "[n]ormally, this floc layer is formed in the lower portion of the tank..." (column 3, lines 29-36). Therefore, the apparatus of Bradford comprises a precipitate chamber (i.e. the lower portion of the tank).

Regarding claims 60 and 98, Bradford discloses, "conduit **72** may be coupled to a rapid sand filtering system," (column 4, lines 3-5) thus comprising a filter chamber.

Regarding claims 61 and 99, Bradford further discloses the mixture exiting the apparatus may be fed to a storage tank for storing the mixture (column 4, lines 10-12).

5. Claims 6-8, 15-17, 67-69 and 76-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradford (U.S. 3,881,700) Regarding Van Loenen (U.S. 2,930,677).

Regarding claims 6-8, 15-17, 67-69 and 76-78, Bradford discloses, "the tank may be constructed of any suitable material... that does not react with the chemicals when combined with the water," (column 2, lines 55-59). However, Bradford is silent as to whether an inside surface of the chamber defined by tank **16** or dish **38** may comprise the recited non-corrosive coating such as a derivative of fluoro polymers or ethyl tetrafluoro ethylene. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide such a coating to the apparatus of Bradford, on the basis of suitability for the intended use, since the use of such coatings is conventionally known in the art, as evidenced by Van Loenen. Van Loenen teaches a coating for walls of process vessels and conduits, wherein the coating may comprise thermoplastic resins such as polytetrafluoro ethylene, or Teflon ^{TM} (column 4, line 44-column 5, line 2). In addition, the Teflon ^{TM} coating reduces the tenacity toward scale formation as compared to the tenacity exhibited by the scale formations to metal surfaces of processing vessels.

6. Claims 1-5, 13, 14, 18-32, 34-40, 42, 49, 50, 53-58, 61-66, 74-75, 83, 84 and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (U.S. 5,782,556).

Regarding claims 1, 62 and 83, Chu (FIG. 1-3; column 2, line 13-column 3, line 30) discloses an apparatus comprising:

a) a chamber (i.e. defined by secondary tank **21**);

b) a dish suspended therein (i.e. conical filter **27**, comprising a perforated film plate converging downward and having a dish shape);

c) an oil-in-water phase mixing liquid delivery system (comprising delivery pipe **15** and charging pump **151**) for introducing the oil-in-water phase mixing liquid into the chamber **21** and to the dish **27** via spraying **25**; and

d) an oil delivery system (comprising oil feeder pipe **261** and charging pump **262**) for introducing the oil into the chamber **21** via the dish **27** via spraying **26**.

Dish **27** comprises a "distribution-blending-cooling" dish, since the dish distributes and blends the materials by, "diffusing and homogeneously mixing the oil and mixing liquid as sprayed from the outer and inner annular sprayers **26, 25** for draining into a lower portion of the secondary tank **21**" (column 2, lines 56-62), and the dish **27** would inherently cool the mixture via heat loss upon diffusing and mixing, depending on the materials mixed. In addition, the delivery systems (comprising charging pumps **151** and **262**) are inherently capable of regulating a rate of flow and amount of water introduced or sprayed into the chamber since it is well known in the art that pumps comprise means for speed or feed rate adjustment. Although Chu is silent as to whether an "acid" or "base" may be introduced via the delivery systems, the apparatus of Chu meets the claims, since the selection of materials to be introduced into the mixer is merely a matter of intended use, which holds no patentable weight in apparatus claims. Furthermore, the apparatus of Chu comprises substantially the recited structural elements, and should therefore be fully capable of utilizing acid or base.

Regarding claims 2-5 and 63-66, no further structural limitations are recited, since "the acid" and "the base" are not considered elements of the apparatus but a matter of intended use. Therefore the apparatus of Chu meets the claims.

Regarding claims 13-14 and 74-75, although Chu is silent as to the dimensions of dish **27**

(i.e., whether the dish is of, "an adequate size/a minimal depth and shape"), it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate dimension and shape for the dish of Chu, on the basis of suitability for the intended use, since changes in shape involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 18-21 and 24-27, Chu discloses the delivery systems each comprise a spray mechanism (i.e. outer and inner annular sprayers **26**, **25**), which provide "in-air mixing".

Regarding claims 22-23 and 28-29, no further structural limitations are recited, since "the hard particles" are not considered an element of the apparatus but a product depending from the intended use of the apparatus. Therefore the apparatus of Chu meets the claims.

Regarding claim 30, no further structural limitations are recited, since slurry is not an element of the apparatus, and therefore the apparatus of Chu meets the claim. In any event, Chu discloses delivery of an inherently slurry like component (i.e. the oil-in-water phase mixing liquid comprising water, oil, catalyst, emulsifying agent, and stabilizer; column 1, line 59 to column 2, line 9), and therefore the apparatus would inherently be capable of utilizing a slurry.

Regarding claims 31 and 49, Chu (FIG. 1; column 2, lines 46-56; column 3, lines 1-7) discloses the delivery systems each comprise:

a) a pump (i.e. charging pump **151** or **262**); and

b) a delivery nozzle (i.e. plurality of spray holes or perforations **260** for outer annular sprayer **26**; plurality of spray nozzle **251** for inner annular pipe **25**), wherein the pump and the delivery nozzle are coupled thereto to introduce the materials into the chamber.

Regarding claims 32 and 50, Chu discloses a reservoir (tank **11**) for the oil-in-water phase mixing liquid being introduced into the chamber **21**, and a supply of "raw heavy oil, fuel oil or crude oil O2", which would inherently comprise a reservoir in order to maintain the supply. Whether the reservoirs comprise acid or base would be a matter of intended use.

Regarding claims 34, 39, 53 and 58, the charging pumps **151**, **262** of Chu are inherently capable of regulating the rate of flow or the amount of the material into the chamber, since it is conventionally known in the art that pumps comprise means for speed or feed rate adjustment.

Regarding claim 35-38 and 54-57, although Chu is silent as to the regulation of the flow rate via flow valves, flow meters, and flow controllers, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such control elements to the apparatus of Chu, on the basis of suitability for the intended use, since flow valves, flow meters, and flow controllers are well known flow regulation means in the art.

Regarding claims 40 and 84, Chu (FIG. 1, 3) discloses sprayers **25**, **26** introduce the materials into the chamber at different points (i.e. at different radial points via the plurality of spray holes or nozzles **260**, **251**).

Regarding claim 42, a vortex may be defined as a spiral motion of fluid within a limited area, especially a whirling mass of water or air that sucks everything near it toward its center. As illustrated by the eddy flows **E**, **E'** in FIG. 1, the flow of fluid is generally of a whirling or spiraling motion, and therefore the turbine agitator **22** of Chu meets the claim of a vortex generator.

Regarding claims 61 and 99, Chu discloses the mixture exiting the apparatus may be fed to a storage tank (column 2, lines 65-68).

7. Claims 41, 43-48 and 85-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (U.S. 5,782,556), as applied to claims 1, 40, 42 62 and 84 above, and further in view of Platz, deceased, et al. (U.S. 4,164,541).

Regarding claims 41, 43-45 and 85-88, Chu discloses a turbine agitator **22** used as the means for generating the vortex but is silent as to other vortex generation means, such as eductors in fluid communication with a pump. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select another means for generating the vortex in the apparatus of Chu, on the basis of suitability for the intended use, since the use of eductor/pump systems for generating a vortex is conventionally known in the art, as evidenced by Platz et al., and furthermore, substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank and Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950). Platz et al. (FIG. 1-3, 5; column 2, line 47 to column 5, line 46) teach a mixing chamber **10** comprising eductors (i.e. venturi pumps **20, 20', 21**) mounted inside the chamber at different elevations, wherein the eductors are in fluid communication with an electric auxiliary pump **18, 18'** via lines **19, 19'**. The placement or direction of the eductors controls the formation of the vortex (see flow lines indicating circular fluid flow). By incorporation of eductors to the apparatus of Chu, the acid delivery system introduces acid into the chamber at different points, comprising points below and above the dish.

Regarding claims 46, 48, 89 and 92, no further structural limitations are recited, since the rotational speed of the acid, size of the vortex and the vortex are not elements of the apparatus.

In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate speed or size for the vortex for enhancing the *in situ* mixing in the modified apparatus of Chu, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233*.

Regarding claims 47 and 90, no further structural limitations are recited, as the language of the claim is drawn to a method limitation. The modified apparatus of Chu meets the claim.

Regarding claim 91, the collective teachings of Chu and Platz are silent as to whether the pump (i.e. electric auxiliary pumps **18**, **18'** as taught by Platz et al.) may comprise a peristaltic pump. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate pump, such as a peristaltic pump, for the pump in the modified apparatus of Chu, on the basis of suitability for the intended use, since the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

8. Claims 1-5, 9-14, 62-66, 70-75 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balla et al. (GB 2 236 694).

Regarding claims 1, 62, and 83, Balla et al. (Figure) disclose an apparatus comprising a chamber (i.e. interior **33** defined by reactor **11**); a dish suspended therein (i.e. the inner vessel of reactor **11**; page 6, lines 5-7; page 7, lines 4-7); and a delivery system (i.e. feeder **19**; page 3, second to last paragraph). The dish comprises a "distribution-blending-cooling" dish, since the dish distributes and blends the materials **34** participating in the reaction and also cools the

materials **34** via cooling means **35**, **40**, **41**, **42**. In addition, the delivery system **19** is inherently capable of regulating a rate of flow and amount of materials introduced into the chamber (i.e. "the feeding may be simply automated at little extra expense"; page 6, second to last bullet). Although Balla are silent as to whether the materials may comprise an "acid" or "base", the apparatus meets the claims, since the selection of materials to be introduced is merely a matter of intended use. The apparatus of Balla comprises substantially the recited structural elements and is therefore capable of utilizing an acid or base.

Regarding claims 2-5 and 63-66, no further structural limitations are recited, since "the acid" and "the base" are not elements of the apparatus, and therefore the apparatus of Balla et al. structurally meets the claims.

Regarding claims 9-10 and 70-71, Balla et al. (Figure; page 2, last paragraph to page 4, third to last paragraph) disclose a cooling coil **35** coupled to the chamber **33**, wherein a temperature sensor **31** cooperates with the coil to regulate the temperature of the chamber (i.e. via control unit **15**).

Regarding claim 11-12 and 72-73, Balla (Figure; page 2, last paragraph to page 4, third to last paragraph) disclose a cooling coil **35** coupled to the dish (i.e. inner vessel of reactor **11**), wherein a temperature sensor **31** cooperates with the coil to regulate the temperature of the dish (i.e. via control unit **15**).

Regarding claims 13-14 and 74-75, Balla disclose the dish (i.e. inner vessel of reactor **11**) may be exchangeable to match the actually required volume (page 6, paragraph 2). It would have been obvious for one of ordinary skill in the art at the time the invention was made to select a dish of adequate size/minimal depth and shape to achieve a required volume in the apparatus of

Balla. Also, changes in shape involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is *703-305-4951***. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*** As of December 10, 2003, the telephone number will be changed to 571-272-1449.*

Jennifer A. Leung
November 06, 2003

HIEN TRAN
PRIMARY EXAMINER